

Standard Specification for Ferrochrome-Silicon¹

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1. Scope

1.1 This specification covers two grades of ferrochrome-silicon designated A and B.

2. Referenced Documents

2.1 ASTM Standards:

E 11 Specification for Wire-Cloth Sieves for Testing Purposes²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications²

E 31 Methods for Chemical Analysis of Ferroalloys³

E 32 Practices for Sampling Ferroalloys and Steel Additives for Determination of Chemical Composition³

E 364 Test Methods for Chemical Analysis of Ferrochrome-Silicon⁴

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

- 3.1.1 Quantity,
- 3.1.2 Name of material,
- 3.1.3 ASTM designation,
- 3.1.4 Grade,
- 3.1.5 Size, and

3.1.6 Requirements for packaging, analysis reports, etc., as appropriate.

3.2 The basis of payment for ferrochrome-silicon may be per unit weight of alloy or per pound of contained chrome and silicon.

4. Chemical Composition

4.1 The various grades shall conform to the requirements as to chemical composition specified in Table 1 and Table 2.

4.2 The manufacturer shall furnish an analysis of each shipment showing the elements specified in Table 1.

¹ This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.18 on Castings.

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² Annual Book of ASTM Standards, Vol 14.02.

³ Annual Book of ASTM Standards, Vol 03.05.

⁴ Annual Book of ASTM Standards, Vol 03.06.

TABLE 1 Chemical Requirements

Element	Composition, %	
	Grade A	Grade B
Chromium	34.0–38.0	38.0–42.0
Carbon, max	0.060	0.050
Silicon	38.0–42.0	41.0–45.0
Sulfur, max	0.030	0.030
Phosphorus, max	0.030	0.030

4.3 The values shown in Table 2 are expected maximums. Upon request of the purchaser, the manufacturer shall furnish an analysis for any of these elements on a cumulative basis over a period mutually agreed upon between the manufacturer and the purchaser.

5. Size

5.1 The various grades are available in sizes as listed in Table 3.

5.2 The sizes listed in Table 3 are typical as shipped from the manufacturer's plant. These alloys exhibit varying degrees

TABLE 2 Supplementary Chemical Requirements^A

Element	Composition, max, percent Ferrochrome-Silicon (Grades A and B)
Nitrogen	0.050
Manganese	0.75
Nickel	0.50
Vanadium	0.50
Copper	0.050
Molybdenum	0.050
Columbium	0.050
Tantalum	0.050
Cobalt	0.10
Aluminum	0.50
Titanium	0.50
Zirconium	0.050
Arsenic	0.005
Lead	0.005
Tin	0.005
Zinc	0.005
Boron	0.005
Antimony	0.005
Silver	0.005
Bismuth	0.005

^AFor purposes of determining conformance with this specification, the reported analysis shall be rounded to the nearest unit in the right-hand place of figures used in expressing the limiting value, in accordance with the rounding method of Practice E 29.



TABLE 3 Standard Sizes and Tolerances

Product	Standard Sizes	Tolerances ^A
Ferrochrome-Silicon	75 lb by down	90 lb lump, max
	75 lb by 1 in. (25.4 mm)	90 lb lump, max
	75 lb by 2 in. (50.8 mm)	90 lb lump, max
	40 lb by down	50 lb lump, max
	25 lb by down	30 lb lump, max
	4 in. (101.6 mm) by down	10% max, retained on 4-in. (100-mm) sieve
	3 in. (76.2 mm) by down	10% max, retained on 3 in. (75-mm) sieve
	3 by ½ in. (76.2 by 12.7 mm)	10% max, retained on 3-in. (75-mm) sieve
	2 in. (50.8 mm) by down	10% max, retained on 2-in. (50-mm) sieve
	2 by ¼ in. (50.8 by 6.35 mm)	10% max, retained on 2-in. (50-mm) sieve
	¾ in. (19.05 mm) by down	10% max, retained on ¾ in. (19.0-mm) sieve

^ASpecifications of sieve sizes used to define tolerances herein are as listed in Specification E 11.

of friability; therefore, some attrition may be expected in transit, storage, and handling. A quantitative test is not available for rating relative friability of ferroalloys. A code system has been developed, therefore, for this purpose, and a number rating each product type is shown in the last column of Table 3. Definitions applicable to these code numbers are given in the Appendix.

6. Sampling

6.1 The material shall be sampled in accordance with Practices E 32.

6.2 Other methods of sampling mutually agreed upon by the manufacturer and by the purchaser may be used; however, in case of discrepancy, Practices E 32 shall be used for referee.

7. Chemical Analysis

7.1 The chemical analysis of the material shall be made in accordance with the procedure for the ferroalloys as described in Methods E 31 and Test Methods E 364, or alternative methods which will yield equivalent results.

7.2 If alternative methods of analysis are used, in case of discrepancy, Methods E 31 and Test Methods E 364 shall be used for reference.

7.3 Where no method is given in Methods E 31 or Test Methods E 364 for the analysis of a particular element, the analysis shall be made in accordance with a procedure agreed upon between the manufacturer and the purchaser.

8. Inspection

8.1 The manufacturer shall afford the inspector representing the purchaser all reasonable facilities, without charge, to satisfy him that the material is being furnished in accordance with this specification.

9. Rejection

9.1 Any claims or rejections shall be made to the manufacturer within 45 days from receipt of material by the purchaser.

10. Packaging

10.1 The material shall be packaged in sound containers, or shipped in bulk, in such a manner that none of the product is lost or contaminated in shipment.

10.2 Each package shall be identified with product name and other information required by OSHA regulations.

APPENDIX

(Nonmandatory Information)

X1. FRIABILITY RATINGS

Code No.	Definition
1	Very tough materials which are susceptible to little, if any, breakage during shipment or handling. (Example: low-carbon ferrochrome)
2	Some breakage of large pieces probable in shipping and handling. No appreciable fines produced from either lump or crushed sizes. (Example: chrome metal)
3	Appreciable reduction in size of large pieces possible in shipping and handling. No appreciable production of fines in handling of crushed sizes. (Example: ferrovanadium)
4	Appreciable reduction in size of large pieces upon repeated handling. Some fines produced upon repeated handling of crushed sizes. (Example: Standard ferromanganese)
5	Appreciable reduction in size in repeated handling of large pieces. Appreciable fines may be produced in the handling of crushed sizes. (Example: 50 percent ferrosilicon)
6	This category represents the most friable alloys. (Example: calcium-silicon)



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